An Introduction to Inequalities

We are about to learn how to use a whole new set of Mathematical symbols

The inequality symbols are as follows: $>$, $\geq$, $<$, and $\leq$.

So, how do we use them and what do they mean?

Like equations and the equals sign (**=**), inequalities allow us to solve for an unknown variable x.

Let's go through each symbol individually to thoroughly understand its meaning.

$x > 5$, "x" is larger than 5

$x \geq 2$, "x" is larger than or equal to 2

$x < 4$, "x" is smaller than 4

$x \leq 3$, "x" is smaller than or equal to 3

Notice that when the extra line is added to the inequality symbol ($\geq$ or $\leq$). The "x" is also equal to that number.

While there are only four inequality symbols to choose from, there are several ways $x \geq 2$, can be expressed in words.

The remainder of the notes in this section will be focused on translating words into the four inequality symbols we have looked at.

The following phrases and corresponding translations will help you with the word problems in future sections.

Here are the most common inequality phrases in word problem examples.

x is a minimum of 5
$x \geq 5$

x is a maximum of 10
$x \leq 10$

x is at least 7
$x \geq 7$

x is at most 2
$x \leq 2$

x is more than 3
$x > 3$

x is greater than 8
$x > 8$

x is less than 9
$x < 9$

x is no more than 12
$x \leq 12$

x is no more than 15
$x \leq 15$

Keep a copy of these phrases nearby when you are doing the following examples and questions.

You are ready to test your new skills.

Example

1. Write the following statement as an inequality.

The maximum value of x is 17.

Step 1: What does "maximum" mean?

"Maximum" means **less than or equal to**

Step 2: Write the inequality

$$\mathbf{x \leq 17}$$

2. Write the following statement as an inequality.

Y is less than -4.

Step 1: What is the symbol for less than?

Remember $<$ is the symbol for less than

Step 2: Write the inequality

$$\mathbf{y < -4}$$

3. Write the following statement as an inequality.

X can be no less than 3.

Step 1: What does "no less than" mean?

"No less than" means **greater than or equal to**

Step 2: Write the inequality

$$\mathbf{x \geq 3}$$

4. Translate the following statement into an inequality. Let x represent the number of apples in a basket. There is a minimum of 10 apples in each basket.

Step 1: Define "x"

x: # of apples

Step 2: A minimum of 10 apples

x has a minimum of 10

Step 3: Write the inequality

$$\mathbf{x \geq 10}$$

5. In a Math class there are 5 more girls than boys. Let x represent the number of boys in the class. What inequality would describe the situation where there are 32 students or less in this class?

Step 1: Define the number of boys and girls in terms of x

Boys : x

Girls: x + 5

Step 2: 32 students or less; write the inequality

Boys + Girls = # of students

$$x + x + 5 \leq 32$$

$$2x + 5 \leq 32$$

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